

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) An inhibitor of histone deacetylase represented by formula (1):



wherein

Cy is a heterocyclic moiety selected from the group consisting of furan, benzofuran, thiophene and benzothiophene, any of which may be optionally substituted;

X is selected from the group consisting of C=O, C=CH₂, CH(OH), CH(OR¹), C=N(OH), and C=N(OR¹), where R¹ is alkyl, aryl, aralkyl, or acyl;

Y¹ is a C₃-C₇ alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the alkylene chain connecting X and W may be replaced with O, NR³, or S(O)_n, where R³ is hydrogen, alkyl, aryl, aralkyl, acyl, alkoxy carbonyl, or carbamoyl ~~carbamoyl~~, and n is 0, 1, or 2, provided that the atoms in Y¹ that are attached to X and W are carbon atoms, and further provided that Y¹ ~~is not~~ does not comprise an ester or amide linkage in the ~~linear~~ alkylene chain connecting X and W; and

W is selected from the group consisting of -C(O)-CH₂-SR², -C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

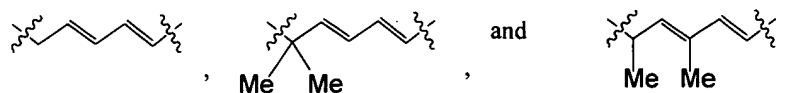
R² is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation;

and Z is selected from the group consisting of aniliny, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which

groups optionally may be substituted with halo, hydroxyl, amino, nitro, C₁-C₄ alkyl, or C₁-C₄ alkoxy.

2. (Cancelled)
3. (Previously Presented) The inhibitor of claim 1, wherein the heterocyclic moiety is substituted by one or two substituents independently selected from the group consisting of C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₆-C₁₀ aryl, heteroaryl, heterocyclyl, (C₆-C₁₀)ar(C₁-C₆)alkyl, halo, nitro, hydroxy, C₁-C₆ alkoxy, C₆-C₁₀ aryloxy, heteroaryloxy, C₁-C₆ alkoxycarbonyl, C₆-C₁₀ aryloxycarbonyl, heteroaryloxycarbonyl, carboxy, and amino.
4. (Cancelled)
5. (Cancelled)
6. (Original) The inhibitor of claim 1, where X is selected from the group consisting of CH(OR¹), C=N(OH), and C=N(OR¹), where R¹ is C₁-C₆ alkyl, C₆-C₁₀ aryl, or (C₆-C₁₀)ar(C₁-C₆)alkyl.
7. (Previously Presented) The inhibitor of claim 1, wherein one to three carbon atoms of the alkylene are independently substituted with halo, oxo, oximino, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, alkoxycarbonyl, carboxy, hydroxyalkyl, acyl, acyloxy, or cyano.
8. (Currently Amended) The inhibitor of claim 1, wherein Y¹ is an all carbon ~~linear~~ alkylene chain connecting X and W.
9. (Currently Amended) The inhibitor of claim 8, wherein the ~~linear~~ alkylene chain connecting X and W is a dienyl moiety, wherein the dienyl moiety is attached to W.
10. (Previously Presented) The inhibitor of claim 9, wherein Y¹ is selected from the group consisting of



11. (Original) The inhibitor of claim 8, wherein Y^1 is $-(CH_2)_m$, where m is 5, 6, or 7.
12. (Original) The inhibitor of claim 1, wherein one carbon atom in the linear chain connecting X and W is replaced with O , NR^3 , or $S(O)_n$.
13. (Original) The inhibitor of claim 12, wherein Y^1 is $-(CH_2)-S(O)_n-(CH_2)_p$, where n is 0, 1, or 2, and p is 3, 4, or 5.
14. (Original) The inhibitor of claim 1, wherein W is $-C(O)-NH-OM$, M being selected from the group consisting of hydrogen, sodium, potassium, magnesium, and calcium.
15. (Original) The inhibitor of claim 1, wherein W is $-C(O)-NH-Z$ or $NH-C(O)-NH-Z$, Z being unsubstituted 2-anilinyll or unsubstituted 2-pyridyl.
16. (Original) The inhibitor of claim 1, wherein W is $-C(O)-CH_2-SR^2$, R^2 being selected from the group consisting of C_1-C_6 alkyl, C_6-C_{10} aryl, $(C_6-C_{10})ar(C_1-C_6)alkyl$, $(C_1-C_6 alkyl)Carbonyl$, $(C_6-C_{10} aryl)carbonyl$, and $((C_6-C_{10})ar(C_1-C_6)alkyl)carbonyl$, wherein the aryl portion of any such groups may be optionally substituted.
17. (Original) The inhibitor of claim 16, wherein R^2 is selected from the group consisting of methyl, phenyl, benzyl, benzoyl, and acetyl.
18. (Currently Amended) An inhibitor of histone deacetylase represented by formula (2):



wherein

Cy is a heterocyclic moiety selected from the group consisting of furan, benzofuran, thiophene and benzothiophene, any of which may be optionally substituted by one or two substituents independently selected from the group consisting of C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₆-C₁₀ aryl, heteroaryl, heterocyclyl, (C₆-C₁₀)ar(C₁-C₆)alkyl, halo, nitro, hydroxyl, C₁-C₆ alkoxy, C₆-C₁₀ aryloxy, heteroaryloxy, C₁-C₆ alkoxycarbonyl, C₆-C₁₀ aryloxycarbonyl, heteroaryloxycarbonyl, carboxy, and amino;

Y² is C₅-C₇ alkylene, wherein said alkylene maybe optionally substituted, and wherein one or two carbon atoms in the alkylene chain connecting CY and W may be replaced with O, NR³, or S(O)_n, where R³ is hydrogen, alkyl, aryl, aralkyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2, provided that Y² ~~is not~~ does not comprise an ester or amide linkage in the ~~linear~~ alkylene chain connecting Cy and W; and

W is selected from the group consisting of -C(O)-CH₂-SR², -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R² is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted; and

Z is selected from the group consisting of aniliny, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinyethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxyl, amino, nitro, C₁-C₄ alkyl, or C₁-C₄ alkoxy.

19. (Cancelled)
20. (Cancelled)
21. (Cancelled)
22. (Cancelled)

23. (Previously Presented) The inhibitor of claim 18, wherein one to four carbon atoms of the alkylene are independently substituted with halo, oxo, oximino, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, alkoxycarbonyl, carboxy, hydroxyalkyl, acyl, acyloxy, or cyano.
24. (Currently Amended) The inhibitor of claim 18, wherein one carbon atom in the ~~linear~~ alkylene chain connecting Cy and W is replaced with O, NR³, or S(O)_n.
25. (Currently Amended) The inhibitor of claim 18, wherein one carbon atom in the ~~linear~~ alkylene chain connecting Cy and W is replaced with NR³, where R³ is selected from the group consisting of C₁-C₆ alkyl, C₆-C₁₀ aryl, (C₆-C₁₀)ar(C₁-C₆)alkyl, (C₁-C₆alkyl) oxycarbonyl, (C₆-C₁₀ aryl)oxycarbonyl, ((C₆-C₁₀)ar(C₁-C₆)alkyl)oxycarbonyl, (C₁-C₆ alkyl)carbonyl, (C₆-C₁₀ aryl)carbonyl, and ((C₆-C₁₀)ar(C₁-C₆)alkyl)carbonyl.
26. (Currently Amended) The inhibitor of claim 18, wherein one or two carbon atoms in the ~~linear~~ alkylene chain connecting Cy and W are replaced by O.
27. (Original) The inhibitor of claim 18, wherein W is -C(O)-NH-Z or -NH-C(O)-NH-Z, Z being unsubstituted 2-anilinyll or unsubstituted 2-pyridyl.
28. (Original) The inhibitor of claim 18, wherein W is -C(O)-CH₂-SR², R² being selected from the group consisting of C₁-C₆ alkyl, C₆-C₁₀ aryl, (C₆-C₁₀)ar(C₁-C₆)alkyl, (C₁-C₆ alkyl)carbonyl, (C₆-C₁₀ aryl)carbonyl, and ((C₆-C₁₀)ar(C₁-C₆)alkyl)carbonyl, wherein the aryl portion of any such groups may be optionally substituted.
29. (Original) The inhibitor of claim 28, wherein R² is selected from the group consisting of methyl, phenyl, benzyl, benzoyl, and acetyl.
30. (Currently Amended) An inhibitor of histone deacetylase represented by formula (3):



wherein

Cy is a heterocyclic moiety selected from the group consisting of furan, benzofuran, thiophene and benzothiophene, any of which may be optionally substituted;

Y³ is C₂-C₆ alkylene, wherein said alkylene may be optionally substituted with one or more substituents independently selected from the group consisting of halo, hydroxyl, oxo, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, carboxy, hydroxyalkyl, acyl, acyloxy, and cyano; and

W is selected from the group consisting of -C(O)-CH₂-SR², -C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R² is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen; or a pharmaceutically acceptable cation

Z is selected from the group consisting of aniliny, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxyl, amino, nitro, C₁-C₄, alkyl, or C₁-C₄ alkoxy;

~~provided that Z does not have the formula -(C₅H₃N)-NHC(O)-Y³-NH-S(O)₂-Cy~~

or a pharmaceutically acceptable salt thereof.

31. (Cancelled)
32. (Previously Presented) The inhibitor of claim 30, wherein the aryl or heterocyclic moiety is substituted by one or two substituents independently selected from the group consisting of C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₆-C₁₀ aryl, heteroaryl, heterocyclyl, (C₆-C₁₀)ar(C₁-C₆)alkyl, halo, nitro, hydroxyl, C₁-C₆ alkoxy, C₆-C₁₀

aryloxy, heteroaryloxy, C₁-C₆ alkoxycarbonyl, C₆-C₁₀ aryloxycarbonyl, heteroaryloxycarbonyl, carboxy, and amino.

33. (Cancelled)
34. (Cancelled)
35. (Previously Presented) The inhibitor of claim 30, wherein Y³ is a C₂-C₆ alkylene optionally substituted with one or two non-hydrogen substituents independently selected from the group consisting of halo, hydroxyl, oxo, nitro, (halo)₁₋₅(C₁-C₃)alkyl, C₁-C₆ alkyl, (C₆-C₁₀)ar(C₁-C₆)alkyl, C₁-C₆ alkoxy, C₆-C₁₀ aryloxy, carboxy, hydroxy (C₁-C₆)alkyl, C₁-C₆ alkylcarbonyl, C₆-C₁₀ arylcarbonyl, C₁-C₆ alkylcarbonyloxy, C₆-C₁₀ arylcarbonyloxy, and cyano.
36. (Previously Presented) The inhibitor of claim 30, wherein Y³ is an optionally substituted saturated C₄-C₅ alkylene.
37. (Original) The inhibitor of claim 30, wherein W is -C(O)-NH-OM, M being selected from the group consisting of hydrogen, sodium, potassium, magnesium, and calcium.
38. (Original) The inhibitor of claim 30, wherein W is -C(O)-NH-Z or -NH-C(O)-NH-Z, Z being unsubstituted 2-anilinyl or unsubstituted 2-pyridyl.
39. (Original) The inhibitor of claim 30, where W is -C(O)-CH₂-SR², R² being selected from the group consisting of C₁-C₆ alkyl, C₆-C₁₀ aryl, (C₆-C₁₀)ar(C₁-C₆)alkyl, (C₁-C₆ alkyl)carbonyl, (C₆-C₁₀ aryl)carbonyl, and ((C₆-C₁₀)ar(C₁-C₆)alkyl)carbonyl, wherein the aryl portion of any such groups may be optionally substituted.
40. (Cancelled)
41. (Cancelled)

42. (Currently Amended) A pharmaceutical composition comprising an inhibitor of histone deacetylase represented by formula (1):



wherein

Cy is a heterocyclic moiety selected from the group consisting of furan, benzofuran, thiophene and benzothiophene, any of which may be optionally substituted;

X is selected from the group consisting of C=O, C=CH₂, CH(OH), CH(OR¹), C=N(OH), and C=N(OR¹), where R¹ is alkyl, aryl, aralkyl, or acyl;

Y¹ is a C₃-C₇ alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the alkylene chain connecting X and W may be replaced with O, NR³, or S(O)_n, where R³ is hydrogen, alkyl, aryl, aralkyl, acyl, alkoxy carbonyl, or carbamoyl, and n is 0, 1, or 2, provided that the atoms in Y¹ that are attached to X and to W are carbon atoms, and further provided that Y¹ does not comprise an ester or amide linkage in the ~~linear~~ alkylene chain connecting X and W; and

W is selected from the group consisting of -C(O)-CH₂-SR², -C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where R² is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation;

Z is selected from the group consisting of aniliny, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which group optionally may be substituted with halo, hydroxyl, amino, nitro, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and

a pharmaceutically acceptable carrier, excipient, or diluent.

43. (Currently Amended) A pharmaceutical composition comprising an inhibitor of histone deacetylase represented by formula (2):



wherein

Cy is a heterocyclic moiety selected from the group consisting of furan, benzofuran, thiophene and benzothiophene, any of which may be optionally substituted by one or two substituents independently selected from the group consisting of C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₆-C₁₀ aryl, heteroaryl, heterocyclyl, (C₆-C₁₀)ar(C₁-C₆)alkyl, halo, nitro, hydroxyl, C₁-C₆ alkoxy, C₆-C₁₀ aryloxy, heteroaryloxy, C₁-C₆ alkoxycarbonyl, C₆-C₁₀ aryloxycarbonyl, heteroaryloxycarbonyl, carboxy, and amino;

Y² is C₅-C₇ alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the alkylene chain connecting Cy and W may be replaced with O, NR³, or S(O)_n, where R³ is hydrogen, alkyl, aryl, aralkyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2, provided that Y² ~~is not~~ does not comprise an ester or amide linkage in the ~~linear~~ alkylene chain connecting Cy and W; and

W is selected from the group consisting of -C(O)-CH₂-SR², -NH-C(O)-NH-Z, and -C(O)-NH-Z, where R² is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted; and

Z is selected from the group consisting of anilinyll, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinyllmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxyl, amino, nitro, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and a pharmaceutically acceptable carrier, excipient, or diluent.

44. (Previously Presented) A pharmaceutical composition comprising an inhibitor of histone deacetylase represented by formula (3):



wherein

Cy is a heterocyclic moiety selected from the group consisting of furan, benzofuran, thiophene and benzothiophene, any of which may be optionally substituted;

Y^3 is $\text{C}_2\text{-C}_6$ alkylene, wherein said alkylene may be optionally substituted with one or more substituents independently selected from the group consisting of halo, hydroxyl, oxo, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, carboxy, hydroxyalkyl, acyl, acyloxy, and cyano; and

W is selected from the group consisting of $-\text{C(O)-CH}_2\text{-SR}^2$, $-\text{C(O)-NH-OM}$, $-\text{NH-C(O)-NH-Z}$, and $-\text{C(O)-NH-Z}$, where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation; and

Z is selected from the group consisting of aniliny, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxyl, amino, nitro, $\text{C}_1\text{-C}_4$ alkyl, or $\text{C}_1\text{-C}_4$ alkoxy; and

a pharmaceutically acceptable carrier, excipient, or diluent.

~~provided that Z does not have the formula $-\text{C}_5\text{H}_3\text{N}-\text{NHC(O)-Y}^3\text{-NH-S(O)}_2\text{-Cy}$.~~

45. (Cancelled)

46. (Cancelled)

47. (Currently Amended) A method of inhibiting histone deacetylase in a cell, comprising contacting a cell in which inhibition of histone deacetylase is desired with an inhibitor of histone deacetylase represented by formula (1):



wherein

Cy is a heterocyclic moiety selected from the group consisting of furan, benzofuran, thiophene and benzothiophene, any of which may be optionally substituted;

X is selected from the group consisting of C=O, C-CH₂, CH(OH), CH(OR¹), C=N(OH), and C=N(OR¹), where R¹ is alkyl, aryl, aralkyl, or acyl;

Y¹ is a C₃-C₇ alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the alkylene chain connecting X and W may be replaced with O, NR³, or S(O)_n, where R³ is hydrogen, alkyl, aryl, aralkyl, acyl, alkoxy carbonyl, or carbamoyl, and n is 0, 1, or 2, provided that the atoms in Y¹ that are attached to X and W are carbon atoms, and further provided that Y¹ is ~~not~~ does not comprise an ester or amide linkage in the ~~linear~~ alkylene chain connecting X and W; and

W is selected from the group consisting of -C(O)-CH₂-SR²-C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R² is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation;

Z is selected from the group consisting of aniliny, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxyl, amino, nitro, C₁-C₄ alkyl, or C₁-C₄ alkoxy.

48. (Currently Amended) A method of inhibiting histone deacetylase in a cell, comprising contacting a cell in which inhibition of histone deacetylase is desired with an inhibitor of histone deacetylase represented by formula (2):



wherein

Cy is a heterocyclic moiety selected from the group consisting of furan, benzofuran, thiophene and benzothiophene, any of which may be optionally substituted by one or two substituents independently selected from the group consisting of C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₆-C₁₀ aryl, heteroaryl, heterocyclyl, (C₆-C₁₀)ar(C₁-C₆)alkyl, halo, nitro, hydroxyl, C₁-C₆ alkoxy, C₆-C₁₀ aryloxy, heteroaryloxy, C₁-C₆ alkoxycarbonyl, C₆-C₁₀ aryloxycarbonyl, heteroaryloxycarbonyl, carboxy, and amino;

Y² is C₅-C₇ alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the alkylene chain connecting Cy and W may be replaced with O, NR³, or S(O)_n, where R³ is hydrogen, alkyl, aryl, aralkyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2, provided that Y² ~~is not~~ does not comprise an ester or amide linkage in the ~~linear~~ alkylene chain connecting Cy and W; and

W is selected from the group consisting of -C(O)-CH₂SR², -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R² is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted; and

Z is selected from the group consisting of aniliny, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxyl, amino, nitro, C¹-C⁴ alkyl, or C₁-C₄ alkoxy.

49. (Currently Amended) A method of inhibiting histone deacetylase in a cell, comprising contacting a cell in which inhibition of histone deacetylase is desired with an inhibitor of histone deacetylase represented by formula (3):



wherein

Cy is a heterocyclic moiety selected from the group consisting of furan, benzofuran, thiophene and benzothiophene, any of which may be optionally substituted;

Y^3 is $\text{C}_2\text{-C}_6$ alkylene, wherein said alkylene may be optionally substituted with one or more substituents independently selected from the group consisting of halo, hydroxyl, oxo, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, carboxy, hydroxyalkyl, acyl, acyloxy, and cyano; and

W is selected from the group consisting of $-\text{C(O)-CH}_2\text{-SR}^2$, $-\text{C(O)-NH-OM}$, $-\text{NH-C(O)-NH-Z}$, and C(O)-NH-Z , where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation; and

Z is selected from the group consisting of anilinyll, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinyllmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxyl, amino, nitro, $\text{C}_1\text{-C}_4$ alkyl, or $\text{C}_1\text{-C}_4$ alkoxy;

~~provided that Z does not have the formula $(\text{C}_5\text{H}_3\text{N})\text{-NHC(O)-Y}^3\text{-NH-S(O)}_2\text{-Cy}$.~~

50-56 (Canceled)

57. (Previously Presented) The inhibitor according to claim 1, wherein the cation is a monovalent or divalent cation.

- 58. (Previously Presented) The inhibitor according to claim 30, wherein the cation is a monovalent or divalent cation.
- 59. (Previously Presented) The pharmaceutical composition according to claim 42, wherein the cation is a monovalent or divalent cation.
- 60. (Previously Presented) The pharmaceutical composition according to claim 44, wherein the cation is a monovalent or divalent cation.
- 61. (Previously Presented) The method according to claim 47, wherein the cation is a monovalent or divalent cation.
- 62. (Previously Presented) The method according to claim 49, wherein the cation is a monovalent or divalent cation.